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King, Professor of agricultural physics in the University and Physicist of the Wisconsin Agricultural Experiment Station.[1] For a considerable time Professor King has been studying the effect of various superficial causes upon the level of the water in the interstices of the soil. He has not only discovered a number of curious variations in this "water table," but has devised several ingenious pieces of apparatus for studying the complicated problems which presented themselves, and has been able to ascertain many of the relations between barometric pressure, rain-fall, temperature, seismic vibrations, cropping, manuring, etc., and the level of the ground-water. For details we must refer our readers to the papers themselves.

THE LIST OF mosses included in the catalogue of the flora of West Virginia by Millspaugh (see this journal XVIII, 34) has been separately issued as Contribution No. 32, from the Herbarium of Columbia College. Two new species of Dicranodontium are described, with excellent plates, *D. Virginicum* and *D. Millspaughii.* The latter is *Campylopus flexuosus* Sull. (non Brid.). Eighty-four species and varieties are enumerated.

A. S. HITCHCOCK, Professor of botany in the State Agricultural College of Kansas, has issued a useful descriptive list of the species and key to the genera of the "Woody Plants of Manhattan in their Winter Condition."[2] The list contains sixty-three native and four commonly cultivated species that have escaped. It was prepared originally for the use of the author's students. The nomenclature follows the Rochester agreement, and the sequence that of Gray's Manual.

OPEN LETTERS.

Is Polyporus carnivorous?

The article in the November GAZETTE entitled, "*A probable new category of carnivorous plants*," was read with much interest, although it seems to me that there should be considerable hesitation in accepting Prof. MacMillan's interpretations of the facts, for the following reasons:

1. The flies frequently found on the under surface of *Polyporus applanatus* do not seem to be there from any special preference for the

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[1] KING, F. H.:—Investigations relating to soil moisture. Extracted from the eighth annual report of the Wis. Ag. Exp. Sta., pp. 91–134. Also: Observations and experiments on the fluctuations in the level and rate of movement of ground-water on the Wis. Agric. Exp. Sta. farm and at Whitewater, Wis. U. S. Dep't of Agric , Weather Bureau, bulletin No. 5. Washington, 1892.

[2] Copyrighted and published by the author, Manhattan, Kansas. 8vo. pp. 20.

fungus, but are evidently searching for roosting-places, and may be found in equal numbers on the under surfaces of logs raised from the ground or in any sheltered nooks. Professor MacMillan has noticed that the flies are more abundant, "notably in the evening or toward the middle of the afternoon," and also says, "I have not been able to discover any secretion that might be attractive to the insects given off by the plant, but there may be such."

2. It is not evident that the fungus either catches or kills the flies. Searching for Myxomycetes and Hepaticæ has led me to notice more particularly the fact that small dead flies and other insects are sometimes very abundant in the roosting-places mentioned above, wherever they can hang suspended from a horizontal surface, the position apparently most restful to the insect anatomy, and where the feebler individuals die from cold in the night. How flies with their feet caught in the pores of a *Polyporus* come to lie "flat upon the hymenophore surface," is not plain. One would expect them to hang suspended by their legs, which is usually their position.

3. The fact that the dead insect is soon overgrown by hyphæ of the fungus does not bear directly upon the question, for the growing hymenophore of species of *Polyporus* will spread itself upon almost any foreign body with which it happens to come in contact. When a growing specimen of *P. applanatus* meets with a stem of a living herbaceous plant it spreads over the surface of the latter, and finally encloses it, so that the stem occupies a cylindrical passage up through the fungus. The borders of the lower end of this hole are extended downward along the plant stem, sometimes for a considerable distance below the general plane of the under surface of the specimen. When the foreign body is of small size it is soon completely enclosed in the substance of the fungus. On railroad ties fungi frequently have both upper and lower surfaces covered with elevations and protuberances like those described by Prof. MacMillan, which on investigation may be seen to inclose small bits of coal and cinders. On cutting through such a specimen similar pieces of mineral matter may be found anywhere in its substance.

That the projections formed over the dead flies is white like the growing borders of the hymenophore is very probably due to the fact that in both places the hyphæ are more flocculent, and less closely matted together.

4. That the remains of the insect are not a lasting impediment to the formation of pores does not necessarily imply digestion, for when a small fly has died and dried up, very little solid matter remains to impede anything. In the case where solid particles are enclosed by the fungus a thick layer of hymenophorous tissue is put on, and pores are formed in this just as though no foreign substance were present above them. The parts of the dead fly are ramified and encased by the filaments of the fungus, and when these last arrange themselves to form the usual porous structure it would not be strange if the fly were lost to sight.

5. To say, "It is unquestionably true that the plant derives some nutriment from these flies, for where they fall and raise the surface of the hymenium there are more pores produced than at other points of similar size," appears, to say the least, unwarrantable in view of the

fact, above stated, that the surface, and consequently the number of pores, is increased when the growing hymenophore comes in contact with foreign substances which are not and cannot be digested by the fungus.

It is not intended above to maintain that *Polyporus applanatus* does not digest and get nutriment from the small dead flies, but that the methods of growth of this and allied species are such that the reasons enumerated in Professor MacMillan's article do not seem sufficient to warrant the inference of a carnivorous habit.

There is, however, a fact suggesting that the hyphæ of the fruiting body of *Polyporus* are sufficiently different from those of the vegetative portion not to be concerned with nutrition or digestion. When two logs lie within a few inches of each other and a sporophore of *Polyporus applanatus* grows out of one log and across to the other, it may spread itself out somewhat upon the latter, but its hyphæ do not seem to penetrate, even in cases where the logs are of the same species and in the same stage of decay. Again, a rotten leaf plastered against the growing hymenophore seems to be a serious obstacle to growth. Instead of sending in hyphæ and digesting the leaf, the latter is covered from the edges as any perfectly indigestible substance would be, or if the leaf be too large the growth of the portion covered is abandoned. And yet, *a priori* reasoning would lead us to suppose that a rotten leaf would be more readily dealt with than a fly, being more nearly like the usual food of the fungus.

Indeed, the very fact that the species of parasitic and saprophytic fungi show such decided preference for certain hosts is an important reason for doubting that *Polyporus applanatus* makes active use of animal nourishment.—O. F. COOK, *Huntington, N. Y.*

NOTES AND NEWS.

GARDEN AND FOREST says that the tallest trees in the world are in the gullies of Victoria, one of which is 471 feet high.

BELOIT COLLEGE has recently dedicated a new building known as Pearsons' Hall of Science, in which admirably arranged botanical laboratories find a conspicuous place.

DR. WILLIAM TRIMEN, director of the Royal Botanical Gardens of Ceylon, is preparing a "Handbook to the Flora of Ceylon," which will be issued soon by Dulau & Co., London.

JARS CONTAINING the tubercle-bearing roots of about forty species of North Dakota Leguminosæ will be shown at the World's Fair by Prof. H. L. Bolley, of the State University at Fargo.

THE BOTANICAL SEMINAR of the University of Nebraska has organized an exchange club for the purpose of facilitating exchanges among collectors in Nebraska and rendering them more satisfactory.

THE MONUMENTAL WORK by Engler and Prantl, entitled "Die Natürlichen Pflanzenfamilien" will be specially displayed at the World's Fair in Chicago, by the publisher, W. Engelmann of Leipzig.